A PORTFOLIO MANAGEMENT CASE STUDY: RISK-ADJUSTED PERFORMANCE ANALYSIS OF OPEN-END DIVERSIFIED CORE EQUITY COMMERCIAL REAL ESTATE FUND

by
Michael Keating

A practicum thesis submitted to Johns Hopkins University in conformity with the requirements for the degree of Master of Science in Real Estate

Baltimore, Maryland
December, 2011

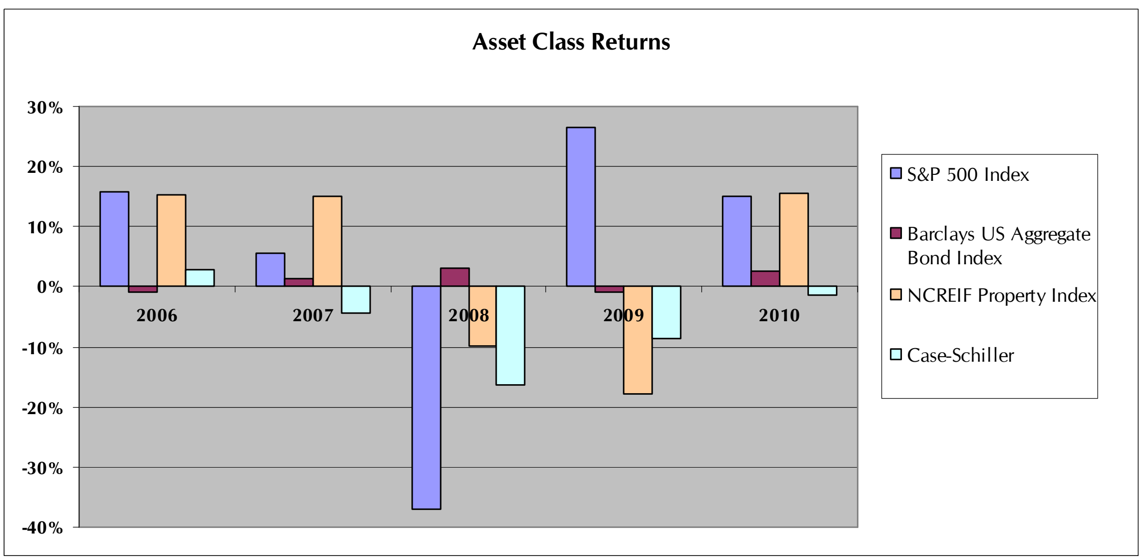
Table of Contents

To many, the concept of portfolio management conjures images of white-shoe investment managers toiling over portfolios of stocks, bonds, and perhaps commodities. A portfolio manager's main objective is to manage a combination of assets whose performance and risk are measured in aggregate. They seek to reduce risk for investors by diversifying a fund's asset base, which reduces variability of return (Staiger, 2011). To that end, the modern investment landscape has expanded the portfolio management paradigm to include so-called alternative asset classes such as hedge funds, private equity, and commercial real estate. Of the alternative assets, commercial real estate in particular has started to shed its "alternative" label and is becoming an essential part of a sophisticated manager's portfolio analysis (Florance et al, 2010).

Commercial real estate consists of properties that are owned to produce income, which is generated through rental payments and as such, the primary value of a piece of real estate is derived from its leases. However, commercial real estate is also a tangible asset with intrinsic value and inflation hedge qualities. Direct investment in commercial real estate has been an important strategic allocation for portfolio managers of endowments, foundations and pension funds for decades: they seek its potential for high income, stable total returns, and added diversification to investment portfolios in volatile markets (Brooks, 2011). Also, commercial real estate offers attractive bond-like qualities in that it produces income through rents to produce a yield that moves conversely with the underlying asset value.

mmercial real estate as long duration asset. Commercial real estate is generally less liquid than other asset classes and has more predictable cash flow characteristics due to the underlying lease structures. As such, commercial real estate is often an attractive investment option for groups that need to match or hedge against long duration liabilities such as insurance companies and pension funds.

The below graph shows the annual returns for equities (S&P 500 Index), fixed income (Barclays US Aggregate Bond Index), commercial real estate (NCREIF Property Index), and residential real estate (Case-Shiller Index):



Source: Standard & Poors, Barclays, NCREIF

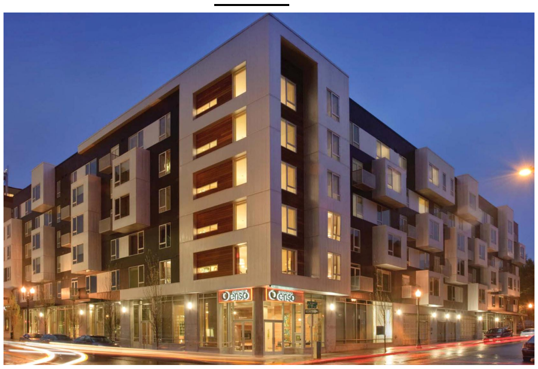
When compared with other asset classes, commercial real estate's annual returns have demonstrated less volatility than equities and more volatility when compared to fixed income and residential real estate. To achieve exposure to commercial real estate, fund managers typically invest in professionally managed real estate funds, which can have widely varying structures and investment strategies. Accordingly, it ial real estate investment with the same discipline as other asset classes. For fund managers, selecting a commercial real estate fund can pose difficulties. Due to the exceedingly idiosyncratic nature of commercial real estate investments, many focus on the property level returns such as income return or internal rate of return (IRR). When focusing on individual property-level IRR's and income returns, it is easy to simply aggregate asset returns to generate portfolio-level returns, which is often used as a proxy for fund performance.

Using aggregated asset returns to derive investment performance is an incomplete assessment because returns alone do not provide a measurement of risk. According to Markowitz's Modern Portfolio Theory, the most efficient portfolio is one that maximizes return given a certain risk tolerance (Markowitz, 1959). That is, to analyze the most efficient or *best performing* portfolio, one must analyze a portfolio's risk-adjusted performance metrics. Markowitz's methodology has been applied for years to traditional investment portfolios and since real estate is now a standard component of a modern investment portfolio, it is logical that it too should be analyzed with the same analytical discipline provided by Markowitz. Using the Multi-Employer Property Trust ("MEPT"), an open-end institutional real estate fund, as a case study, this paper will endeavor to analyze the risk-adjusted performance metrics of a commercial real estate portfolio to calculate investment efficiency. After assessing investment efficiency, this paper will identify commercial real estate portfolio characteristics that are accretive or dilutive to efficiency.

ies

With real estate assets, there are two primary investment strategies: Core and Non-Core. A core strategy involves a conservative approach to real estate investment and the subject of this case study, MEPT, is a core fund. Core funds are generally characterized as focusing on: 1) major property types (office, apartments, industrial, and retail); 2) assets with steady cash flow and strong tenant rosters; 3) newer, functionally superior assets; 4) assets located in primary investment markets; and 5) assets that are highly liquid. By way of example, below are comparative pictures of a core and non-core multifamily building:

Core:



Enso Pearl District, Portland, Oregon

Non-Core:

One Jefferson Apts., Lake Oswego, Oregon

The core building is modern, urban asset that was recently completed while the non-core asset is an older suburban asset constructed with inferior materials. A non-core strategy employs a more aggressive approach to real estate investment and consists of three subsets:

oderate risk/moderate return strategy and involves investing in borderline core properties that require some form of enhancement or value-added element (McDonald & Stiver, 2004).

II. Value-added: This is a medium-to-high risk/medium-to-high return strategy. Generally, it involves buying a property, improving it in some manner, and selling it at an opportune time for a gain. Properties are considered value-added when they exhibit management or operational problems, require physical improvement, and/or suffer from capital constraints (McDonald & Stiver, 2004).

III. Opportunistic: This is a high risk/high return strategy. The properties require a high degree of enhancement. This strategy may also involve investments in development, raw land, and niche property sectors (McDonald & Stiver, 2004).

III. Real Estate Fund Structures

In the institutional real estate world there are generally two types of funds: closed-end funds and open-end funds. A closed-end fund is a collective investment scheme with a limited number of shares and is a popular structure for private equity funds. It is called a closed-end because new shares are rarely issued once the fund has launched, and because shares are not normally redeemable for cash or securities until the fund liquidates (www.sec.gov, n.d.). A closed-end fund is launched after an initial capital raising stage. After the capital raise, these funds typically have a ten year investment period during which properties are acquired followed by a holding period during which active asset management will be carried out and the properties will be sold (McDonald & Stiver, 2004).

As for open-end funds, most people are familiar with this structure by way of mutual funds and the subject of this case study, MEPT, is an open-end fund. As the name implies, open-end funds can issue and investors can redeem shares without liquidation of the fund itself, which is facilitated by periodic valuations. For open-end real estate funds, the periodic valuation is typically on a quarterly basis and consists of a third-party appraisal of each property within the portfolio. Through these individual valuations, an open-end fund is then able to assess its net asset value, which is then used to calculate share value. In contrast to close-end funds, open-end funds are a more convenient real estate investment vehicle for Portfolio Managers due to their liquidity. The ability to invest and withdraw from a real estate investment on a quarterly basis allows for more efficient management of a diversified investment portfolio.

IV. Open-end Diversified Core Equity Funds

MEPT is both core and open-ended; as such, MEPT belongs to a universe of peer funds known as the Open-end Diversified Core Equity (ODCE) funds. The ODCE peer group was created by the National Council of Real Estate Investment Fiduciaries (NCREIF). NCREIF is a not-for-profit trade association that serves its membership, and the academic and investment community's need for improved performance measurement, investment analysis, information standards, education, and peer group interaction (ncreif.org, n.d.). NCREIF tracks the performance of these funds through an index known as the NFI-ODCE ("ODCE"), which tracks the historical and current investment returns of 26 open-end funds pursuing a core strategy (ncreif.org, n.d.). In addition to being open-ended and pursuing a core strategy, ODCE funds must also follow the below guidelines provide by NCREIF:

<u>Net Assets Criteria:</u>

Real Estate - at least 80% of the market value of net assets must be invested in real estate with no more than 20% invested in cash or equivalents.

<u>Real Estate Net Assets Criteria:</u>

- Investment - at least 80% of the market value of real estate net assets must be invested in private equity real estate properties. No more than 20% of such assets may be invested in, but not limited to, property debt, public company, equity/debt or private company (operating business) equity/debt.
- Domain - at least 95% of market value of real estate net assets must be invested in US markets.
- Property Types - at least 80% of market value of real estate net assets must be invested in office, industrial, apartment and retail property types.

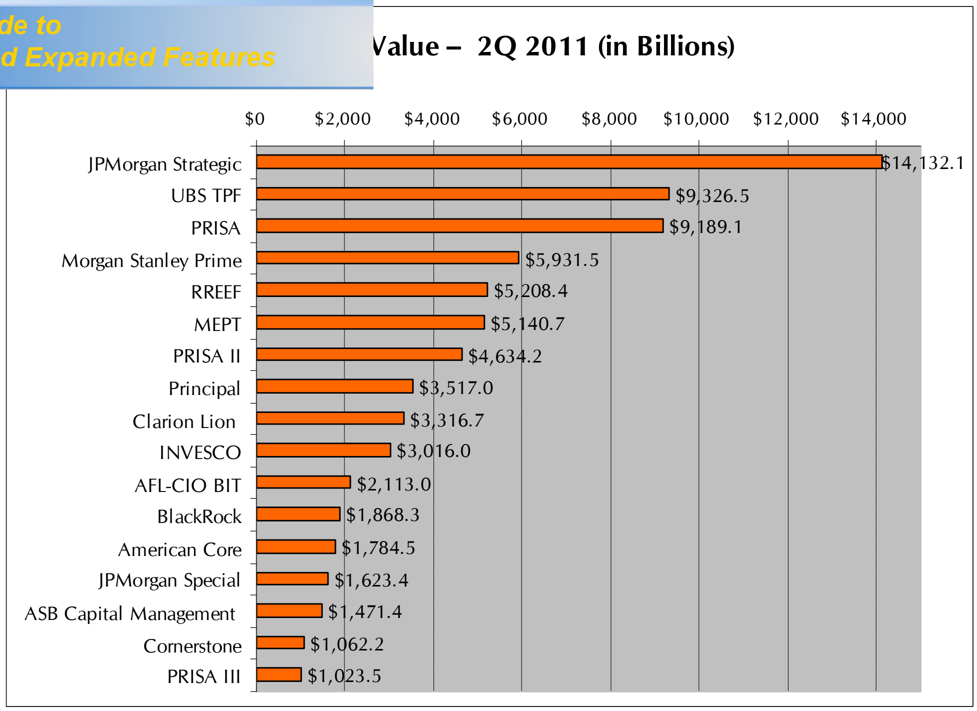
[illegible]0% of market value of real estate net assets must be invested in operating properties. No more than 20% of such assets may be invested in, but not limited to, (pre)development/ redevelopment or initial leasing/lease-up cycles.

- Diversification - no more than 70% (± for market forces) of market value of real estate net assets may be invested in one property type or one region as defined by the NPI.

Total Assets Criteria:

- Leverage - no more than 40% leverage. Leverage is defined as the ratio of total debt, grossed-up for ownership share of off-balance sheet debt, to the fund's total assets, also which are grossed-up for such off-balance sheet debt.

In its historical data, the ODCE index includes 26 funds; however, the ODCE index currently only includes 17 individual funds due to various fund liquidations and merges. The current ODCE funds are listed on the following page:



Source: NCREIF

The total net asset value of the ODCE index as of the second quarter 2011 was $74.4 billion. MEPT was the 6th largest fund in terms of NAV with $5.14 billion in net assets.

V. Multi-Employer Property Trust

As previously mentioned, MEPT is an open-end, core real estate equity fund. The fund invests in a diversified portfolio of institutional-quality real estate assets across the United States (mept.com, n.d.). MEPT was created in 1982 and was originally a development-focused fund due to its targeted investor base: Taft-Hartley (i.e. union) pension plans. At inception, the fund attracted its investor base by offering job creation by means of development while providing investment exposure to real estate. Over the years, however, the fund has shifted from a development strategy

...nd primarily buys existing properties and develops on a very selective basis (never more than 20% of fund NAV). As of the second quarter 2011, MEPT consisted of 149 investments in 30 major metropolitan markets (see Appendix A for a list of all assets) and its property type concentration weighted by net asset value was as follows:

Property Type	MEPT	NCREIF-ODCE
Office	48%	35%
Residential	21%	26%
Retail	8%	22%
Industrial	20%	14%
Other	2%	3%

Source: NCREIF

When compared to the peer group, the most noticeable deviations in product type diversification were MEPT's overweight to office and underweight to retail. The below table details MEPT's regional allocations versus the peer group as of the end of the second quarter 2011:

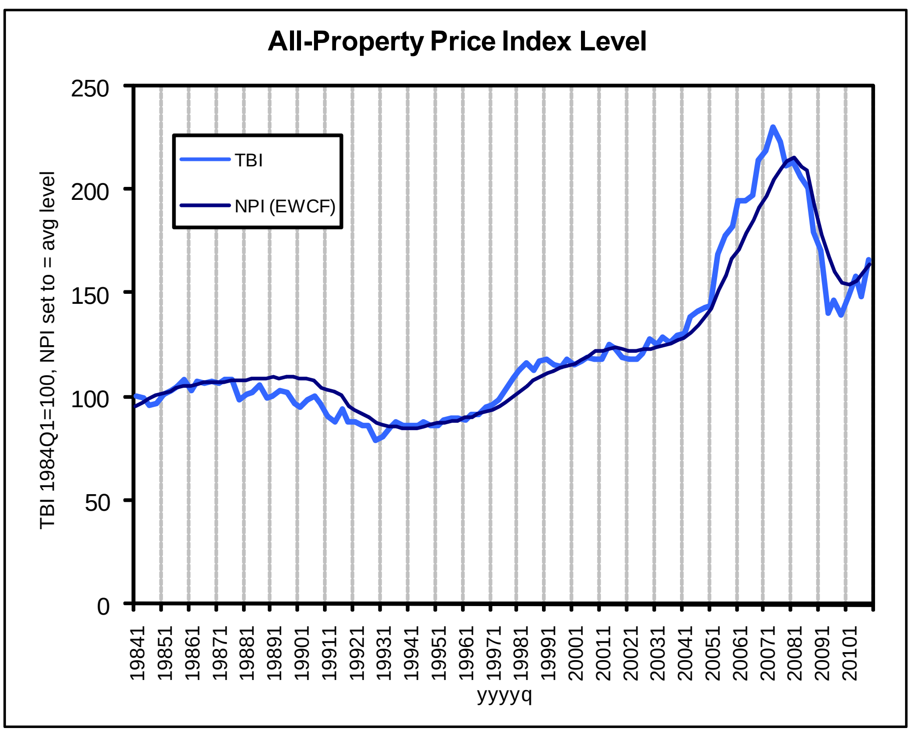
Property Type	MEPT	NCREIF-ODCE
East	36%	36%
Midwest	20%	8%
South	6%	18%
West	38%	38%

Source: NCREIF

In terms of regional diversification, MEPT is similar to the peer group in the East and West; however, MEPT deviates from the benchmark in the South and Midwest as it has a strong overweight in the Midwest and a strong underweight in the South.

VI. MEPT Performance versus the Benchmark

Although MEPT has been active for almost 30 years, this case study will focus on performance from 2001 to 2011. This time period was selected because the U.S. commercial real estate market experienced an entire economic cycle: the up-cycle from 2001–2007, the down-cycle from 2008-2009, and the modest recovery from 2010-2011. The full cycle that occurred during the previous 10 years is shown in the graph below, which illustrates commercial real estate pricing trends from 1984 to the end of 2010:



Source: MIT CRE

As shown above peak relative pricing occurred in 2007 and was followed by a sharp downturn in values in 2008 and 2009. Since the end of 2009, commercial real estate pricing has experienced a modest recovery in values.

s of MEPT as well as the ODCE peer group are detailed in the table below:

Fund Name	Trailing 12-month return	3-year Return	5-year Return	10-year Return
JPMorgan Strategic	18.92%	(6.22%)	1.17%	6.73%
UBS TPF	17.06%	(3.69%)	6.68%	6.98%
PRISA	21.80%	(9.53%)	(1.06%)	5.52%
Morgan Stanley Prime	19.44%	(7.40%)	0.75%	6.46%
RREEF	27.63%	(7.85%)	(0.54%)	5.67%
MEPT	19.28%	(7.98%)	(0.17%)	5.16%
PRISA II	27.35%	(14.12%)	(3.95%)	5.34%
Principal	22.10%	(8.02%)	(0.77%)	5.27%
Clarion Lion	26.72%	(11.83%)	(2.56%)	4.43%
INVESCO	24.80%	(6.70%)	0.18%	n/a
AFL-CIO BIT	17.14%	(6.41%)	0.51%	5.12%
BlackRock	21.64%	(15.90%)	(5.10%)	n/a
American Core	17.64%	(8.00%)	(0.58%)	n/a
JPMorgan Special	28.19%	(14.06%)	(3.60%)	4.05%
ASB Capital Mgmt.	26.04%	(5.09%)	1.89%	7.10%
Cornerstone	16.68%	(6.71%)	0.37%	n/a
PRISA III	29.49%	(18.05%)	(4.27%)	n/a
NCREIF- ODCE	**20.48%**	**(7.67%)**	**0.01%**	**5.64%**

Source: NCREIF

In comparison to the NCREIF-ODCE benchmark returns, MEPT trails in the 1-year by 1.20%, trails in the 3-year by 0.31%, trails in the 5-year by 0.18%, and trails by 0.48% in the 10-year. The table on the following page further breaks down ODCE fund performance by assigning a ranking within the peer group of returns for each timeframe:

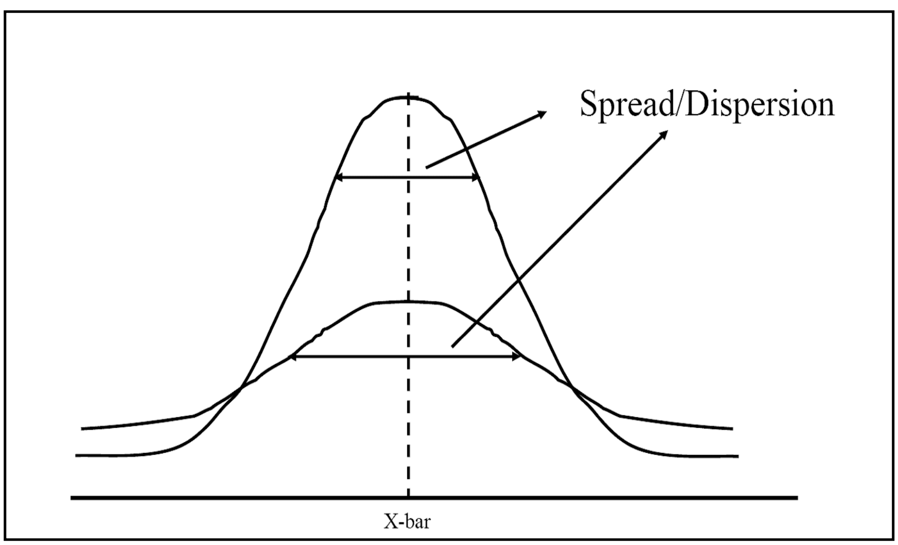
[illegible]	1-year Ranking	3-year Ranking	5-year Ranking	10-year Ranking*
JPMorgan Strategic	13	3	3	3
UBS TPF	16	1	1	2
PRISA	9	11	11	6
Morgan Stanley Prime	11	7	4	4
RREEF	3	8	9	5
MEPT	12	9	8	9
PRISA II	4	15	14	7
Principal	8	17	17	8
Clarion Lion	5	12	12	11
INVESCO	7	5	7	n/a
AFL-CIO BIT	15	4	5	10
BlackRock	10	13	16	n/a
American Core	14	10	10	n/a
JPMorgan Special	2	14	13	12
ASB Capital Mgmt.	6	2	2	1
Cornerstone	17	6	6	n/a
PRISA III	1	16	15	n/a

*Includes only 12 funds

When looking at 1-year returns, MEPT is ranked 12th out of 17 funds. In the last year, commercial real estate experienced a significant recovery in values. ODCE fund returns ranged from 16.7% to 29.5% and the benchmark return was 20.48%, which implies that MEPT trails the peer group average during up-cycles. On the other hand, MEPT ranked 9th in the 3-year and 8th in the 5-year returns, which is right at the median for the peer group. These timeframes include both the recent recovery as well as the sharp downturn caused by the financial crisis of 2008 (see graph on page 9). As such, MEPT's relative return improves when factoring in a down-cycle. However, using the above return comparisons to analyze MEPT's neasurement - one must also consider a fund's risk-adjusted performance

VII. Risk

What exactly is risk-adjusted performance? In the investment context, risk is the unexpected variability or volatility of returns and thus includes both potential worse-than-expected as well as better-than-expected returns (Horcher, 2005). As mentioned before, a portfolio manager seeks to reduce variability. The most overlooked aspect of this definition is the concept of "better-than-expected" returns. That is, low risk implies that the variability of expected returns is limited and as such, an investment is not necessarily less risky simply if it has lower downside return expectations; outsized upside returns also means more risk. Risk can be quantified as variance and standard deviation about an expected outcome or a sample mean (Staiger, 2011). For illustrative purposes, the graph below depicts risk:



utcome and the spread or dispersion of the bell curve represents the variability of expected outcomes (risk).

VIII. Risk-Adjusted Performance Metrics

1) Range

There are several ways to estimate risk, but the simplest method is Range, which is the distance from largest to highest value. When looking at MEPT's 1, 3, 5, and 10-year returns, the range of returns is 27.26%. Below is a comparison of MEPT's range versus the ODCE peer group:

Fund Name	Range of Returns	Fund Ranking (low to high)
JPMorgan Strategic	25.14%	4
UBS TPF	20.75%	1
PRISA	31.33%	10
Morgan Stanley Prime	26.84%	6
RREEF	35.48%	12
MEPT	27.26%	7
PRISA II	41.47%	15
Principal	30.12%	8
Clarion Lion	38.55%	14
INVESCO	31.50%	11
AFL-CIO BIT	23.55%	3
BlackRock	37.54%	13
American Core	25.64%	5
JPMorgan Special	42.25%	16
ASB Capital Mgmt.	31.13%	9
Cornerstone	23.39%	2
PRISA III	47.54%	17
NCREIF- ODCE	**28.15%**	-

of returns over the last 10 years against the peer group, MEPT is ranked 7th out of 17 funds, which places it in the 2nd quartile. Additionally, MEPT has a smaller range than the ODCE benchmark range. A smaller range indicates a lower risk profile; therefore, when looking at range only, MEPT has a lower risk profile than the average ODCE fund.

2) Variance and Standard Deviation

Another method to analyze risk is Variance. In statistics, variance is the measure of dispersion in a set of numbers (Anderson et al, 1995). Essentially, it measure how far a group of number is spread out. The formula for variance is:

$$S^2 = \frac{\sum (x_i - \bar{x})^2}{(n-1)}$$

When comparing variance values, a lower value indicates that there is less dispersion and therefore, lower risk. A third measurement of risk is standard deviation, which is the positive square of variance (Anderson et al, 1995). Like variance, it measures dispersion and low values indicate that the data points being analyzed are closer to the mean than higher values. Unlike variance, standard deviation is expressed in the same units as the data (percentages for the purposes of this analysis); as such, it is often a preferred metric to variance. The standard deviation formula is below:

$$\sigma_s = \sqrt{\frac{\sum (x_i - \bar{x})^2}{n-1}}$$

ation calculations for MEPT and the ODCE peer funds are detailed below:

Fund Name	Average Returns*	Variance	Standard Deviation	Fund Ranking
JPMorgan Strategic	4.62%	0.0167	12.92%	4
UBS TPF	6.68%	0.0108	10.38%	1
PRISA	3.74%	0.0263	16.21%	9
Morgan Stanley Prime	4.26%	0.0189	13.76%	6
RREEF	6.41%	0.0351	18.73%	12
MEPT	3.71%	0.0197	14.04%	7
PRISA II	3.09%	0.0467	16.21%	15
Principal	4.44%	0.0247	15.72%	8
Clarion Lion	4.11%	0.0405	20.12%	14
INVESCO	6.09%	0.0274	16.56%	11
AFL-CIO BIT	3.75%	0.0147	12.10%	3
BlackRock	0.21%	0.0373	19.33%	13
American Core	3.02%	0.0174	13.19%	5
JPMorgan Special	3.51%	0.0484	22.00%	16
ASB Capital Mgmt.	7.61%	0.0267	16.34%	10
Cornerstone	3.45%	0.0144	11.99%	2
PRISA III	2.39%	0.0598	24.46%	17
NCREIF- ODCE	**4.27%**	**0.0212**	**14.55%**	**-**

*Average of the 1, 3, 5 year returns

Similar to the results of the Range calculation, MEPT is the 7th ranked fund in terms of variance and standard deviation, both better than the ODCE benchmark. Also, it is important to note that MEPT's average return over the 1, 3, and 5-year timeframes is lower than the ODCE average by 0.56%. According to the above table, MEPT has a lower risk profile (smaller variance), but lower returns in comparison to the ODCE benchmark.

rformance and Efficiency

To summarize, below is a table detailing MEPT's comparative rankings in terms of return and risk metrics:

Multi-Employer Property Trust		Peer Group Ranking
Return Metrics:		
1- year Return	19.28%	12
3- year Return	(7.98%)	9
5- year Return	(0.17%)	8
10- year Return	5.16%	9*
Risk Metrics:		
Range of Returns	27.26%	7
Variance of Returns	0.0197	7
Standard Deviation of Returns	14.04%	7

*Includes only 12 funds

MEPT is below-average in terms of returns as it consistently ranked in the third quartile of the peer group in the 1, 3, 5 and 10-year timeframes. However, when considering the risk metrics, MEPT is consistently in the second quartile as it ranks 7th out of 18 funds in the range, variance, and standard deviation of its returns. MEPT realized lower relative returns, but had lower relative risk.

To further summarize the results of the risk metrics, the table on the following page compares the ODCE funds' risk ranking (in terms of variance and standard deviation) and return ranking:

[illegible]	[illegible]ard Deviation Ranking	Average Returns Ranking*
JPMorgan Strategic	4	3
UBS TPF	1	1
PRISA	9	11
Morgan Stanley Prime	6	4
RREEF	12	9
MEPT	7	8
PRISA II	15	14
Principal	8	17
Clarion Lion	14	12
INVESCO	11	7
AFL-CIO BIT	3	5
BlackRock	13	16
American Core	5	10
JPMorgan Special	16	13
ASB Capital Mgmt.	10	2
Cornerstone	2	6
PRISA III	17	15

*Average of the 1, 3, 5 year returns

By simply looking at the rankings for risk and return above, it is difficult to discern a recognizable pattern of relative risk-adjusted performance. However, by calculating a fund's ***efficiency*** – the ratio of risk and return – one can determine which funds maximize return for a given risk level and therefore, **maximize performance**. A comparable efficiency metric can be produced by dividing standard deviation (the proxy for risk) by the average return. The most efficient or best performing funds have a lower efficiency value on account of having a relatively low numerator (risk) and a relatively high denominator (return). The table on the following page shows the efficiency values for each fund:

	d n	Average Returns*	Efficiency	Fund Ranking
JPMorgan Strategic	12.92%	4.62%	2.80	4
UBS TPF	10.38%	6.68%	1.55	1
PRISA	16.21%	3.74%	4.33	11
Morgan Stanley Prime	13.76%	4.26%	3.23	6
RREEF	18.73%	6.41%	2.92	5
MEPT	14.04%	3.71%	3.78	10
PRISA II	16.21%	3.09%	5.25	14
Principal	15.72%	4.44%	3.54	9
Clarion Lion	20.12%	4.11%	4.90	13
INVESCO	16.56%	6.09%	2.72	3
AFL-CIO BIT	12.10%	3.75%	3.23	7
BlackRock	19.33%	0.21%	93.06	17
American Core	13.19%	3.02%	4.37	12
JPMorgan Special	22.00%	3.51%	6.27	15
ASB Capital Mgmt.	16.34%	7.61%	2.15	2
Cornerstone	11.99%	3.45%	3.48	8
PRISA III	24.46%	2.39%	10.23	16
NCREIF- ODCE	**14.55%**	**4.27%**	**3.41**	**-**

*Average of the 1, 3, 5 year returns

In terms of efficiency, MEPT drops back to 10th in the peer group versus its risk ranking of 7th and was below the ODCE median. There were several funds that had higher risk levels, but better efficiency than MEPT. For example, RREEF had a standard deviation of 18.73%, which ranked 12th in the peer group, but had an efficiency ranking of 5th. Another example was ASB, which had a standard deviation rank of 10th, but an efficiency ranking of 2nd. To better understand why certain funds have better efficiency, it is prudent to examine the specific characteristics of each fund.

nce Efficiency

All ODCE funds follow similar general core investment strategies; however, each fund has a unique portfolio and, as demonstrated above, has distinctive risk and return profiles. There are three main macro-level ways that ODCE funds can distinguish their portfolios – regional diversification, property type diversification, and fund leverage. As such, the below analysis will attempt to uncover patterns in these characteristics that correlate with portfolio efficiency.

1) Geographic Diversification

NCREIF defines four distinct geographic regions: East, South, Midwest, and West (see Appendix B for regional descriptions). As of the 2nd quarter 2011, the regional allocations for the ODCE funds were as follows:

Fund Name	East	Midwest	South	West	Efficiency Rank
JPMorgan Strategic	29%	6%	23%	34%	4
UBS TPF	39%	10%	28%	38%	1
PRISA	42%	6%	20%	32%	11
Morgan Stanley Prime	33%	12%	22%	33%	6
RREEF	30%	8%	10%	52%	5
MEPT	36%	20%	6%	38%	10
PRISA II	43%	4%	16%	36%	14
Principal	22%	12%	23%	43%	9
Clarion Lion	40%	11%	13%	37%	13
INVESCO	45%	5%	11%	39%	3
AFL-CIO BIT	n/a	n/a	n/a	n/a	7
BlackRock	28%	4%	22%	46%	17
American Core	33%	8%	25%	34%	12
JPMorgan Special	45%	8%	20%	36%	15

		n/a	n/a	n/a	2
		8%	5%	48%	8
PRISA III	40%	3%	33%	24%	16
NCREIF- ODCE	**36%**	**8%**	**18%**	**38%**	**-**

Source: NCREIF

When analyzing the regional allocations and efficiency rankings, no meaningful patterns emerge that correlate with high or low risk. For example, UBS TPF and INVESCO (1st and 3rd respectively in efficiency rank) have differing allocation percentages in all regions. MEPT exactly matches the benchmark in the East and West, but has an over-allocation to the Midwest and under-allocation to the South. The only real pattern that emerges is that all funds generally have similar allocation percentages to the NCREIF-ODCE benchmark. In fact, the largest single deviation from the benchmark is PRISA III's allocation to the South, which is only 15 percentage points higher than the ODCE average. The above data indicates that efficiency is not directly influenced by regional allocation alone and as such, one must look at other fund characteristics such as property type diversification.

2) Property Type Diversification

NCREIF categorizes properties into five different groups: Office, Industrial, Retail, Multifamily, and Other. The Other category within the ODCE peer group primarily consists of hotels; however, it also includes land, parking garages, senior housing, and self-storage. The table on the following page details the property type diversification of each fund:

[illegible]	[illegible]	Industrial	Retail	Multifamily	Other	Efficiency Rank
[illegible]	[illegible]	14%	20%	26%	0%	4
UBS TPF	27%	10%	23%	33%	7%	1
PRISA	35%	13%	20%	25%	8%	11
Morgan Stanley Prime	36%	11%	18%	24%	10%	6
RREEF	29%	37%	17%	17%	0%	5
MEPT	48%	20%	8%	21%	2%	10
PRISA II	39%	0%	22%	19%	21%	14
Principal	22%	12%	23%	18%	4%	9
Clarion Lion	29%	16%	17%	37%	11%	13
INVESCO	39%	11%	13%	37%	0%	3
AFL-CIO BIT	n/a	n/a	n/a	n/a	n/a	7
BlackRock	37%	15%	23%	25%	0%	17
American Core	39%	16%	22%	22%	0%	12
JPMorgan Special	36%	18%	5%	37%	6%	15
ASB Capital Mgmt.	n/a	n/a	n/a	n/a	n/a	2
Cornerstone	35%	14%	17%	27%	7%	8
PRISA III	31%	0%	17%	20%	32%	16
NCREIF- ODCE	**35%**	**14%**	**22%**	**26%**	**3%**	**-**

Source: NCREIF

The product type diversification figures start to reveal a pattern for funds with high and low efficiency. The top 5 funds in terms of efficiency (excluding ASB Capital Management, which has no property type data) have an average property type allocation to Other and Multifamily of 30.8%. Conversely, the bottom 5 funds in terms of efficiency have a much higher allocation to Other and Multifamily. These bottom performers had an average property type allocation to Other and Multifamily of 43.6%.

The data above also suggests that an allocation to Other and Multifamily that is *too low* can also dilute efficiency. MEPT has a below-median efficiency rank of 10th and tifamily of 23%. Similarly, the 9th, 11th, and 12th ranked funds have an average allocation to Other and Multifamily of 25.7%. This pattern suggests that an optimal allocation to Other and Multifamily is around 30%; allocations that are materially higher or lower can negatively affect efficiency. This is due to the relatively volatile return characteristics of Other and Multifamily. Too high an allocation involves too much risk and too low an allocation forgoes higher returns. The below table shows the 1, 3, and 5-year returns for all property types with Hotels being used as a proxy for Other:

Source: NCREIF

As the table above shows, Multifamily has the highest 1-year return, which provides the return "boost." At the same time, Multifamily had the highest variability of returns (standard deviation); however, this was due to higher 1-year or up-cycle returns. Hotel had the second highest standard deviation of returns. Moreover, the additional property types in the Other classification include land, parking garages, senior housing, and self-storage. While there is limited performance data for these property types, the anecdotal evidence of the volatility of these product types is that they are non-core and as mentioned previously, non-core investments take greater risk in attempts to achieve greater return. As the table above indicates, funds that are *over-allocated* to Other and Multifamily will experience greater volatility in overall returns and funds that are *under-allocated* are denied a higher concentration of accretive returns.

Leverage (or debt) increases the risk or volatility of a real estate investment. Quite simply, leverage is a technique to multiply gains and losses (Brigham, 1995). As the size of an equity investment decreases, the percentage of gains and losses is multiplied, which is beneficial in an up-cycle and potentially devastating in a down-cycle. In all cycles, however, leverage increase volatility and therefore risk. Below is a table detailing the leverage levels for all ODCE funds:

Fund	2Q 2011 Leverage	Efficiency Rank
JPMorgan Strategic	25.6%	4
UBS TPF	13.3%	1
PRISA	27.7%	11
Morgan Stanley Prime	31.1%	6
RREEF	32.0%	5
MEPT	16.4%	10
PRISA II	45.8%	14
Principal	21.4%	9
Clarion Lion	39.7%	13
INVESCO	27.0%	3
AFL-CIO BIT	n/a	7
BlackRock	33.1%	17
American Core	18.0%	12
JPMorgan Special	47.7%	15
ASB Capital Mgmt.	n/a	2
Cornerstone	19.9%	8
PRISA III	60.0%	16
NCREIF- ODCE	26.1%	-

Source: NCREIF

Similar to the property type diversification data, there seems to be an optimal level of leverage, above and below which there is a dilutive effect on efficiency. The top 6 funds in efficiency (excluding ASB, which has no leverage data), have average leverage of 25.8%. If you exclude top performing UBS TPF, which is an outlier with r group of 26.1%, the average leverage for the top performing funds is 28.9%. Funds that performed at or below median (7th through 12th, which included MEPT) in terms of efficiency had average leverage of 20.7%. And finally, the lowest performing funds (13th through 17th) had average leverage of 45.3%. Clearly, the pattern above suggests that too much or too little leverage negatively affects efficiency. Top performance was associated with leverage levels in the mid to high 20% range. Average performance was linked to leverage in the low 20% range and worst performance was correlated with higher leverage – over 40%. In the end, leverage can provide a boost when used at prudent levels; however, it can damage performance if too high and drag relative performance when utilized too lightly.

XI. Conclusions:

The goal of this case study was to examine the risk-adjusted performance of MEPT and the ODCE funds. To look at a fund's return by itself is an incomplete assessment as it provides no insight into volatility and variability of returns. For a Portfolio Manager, the goal is to maximize efficiency; or put another way, maximize return given a certain risk tolerance. The table below summarizes the peer group's average returns ranking, standard deviation ranking, and efficiency rank:

Fund Name	Standard Deviation Ranking	Average Returns Ranking*	Efficiency Rank
JPMorgan Strategic	4	3	4
UBS TPF	1	1	1
PRISA	9	11	11
Morgan Stanley Prime	6	4	6

	12	9	5
	7	8	10
PRISA II	15	14	14
Principal	8	17	9
Clarion Lion	14	12	13
INVESCO	11	7	3
AFL-CIO BIT	3	5	7
BlackRock	13	16	17
American Core	5	10	12
JPMorgan Special	16	13	15
ASB Capital Mgmt.	10	2	2
Cornerstone	2	6	8
PRISA III	17	15	16

Average of the 1, 3, and 5 year returns

MEPT had an average return ranking of 8th and a standard deviation ranking of 7th, which shows that MEPT had better than median return and risk. However, MEPT's efficiency rank was below median at 10th, which suggests that MEPT was a relatively inefficient fund. To better understand the relative inefficiency, three macro-level fund characteristics – geographic diversification, property type diversification, and leverage – were analyzed to determine whether the best performing funds followed similar strategies. First, geographical diversification revealed no discernable patterns for maximizing efficiency and in general, all ODCE funds have comparable geographic allocations to the benchmark averages. Second, product type diversification revealed that funds with a material overweight or underweight to Multifamily and Other product types, have lower efficiency. MEPT had an underweight to these product types, which contributed to its lower than median efficiency. Last, having either relatively high or low fund leverage showed a direct

MEPT had the second lowest leverage level in the peer group and accordingly, had lower than median performance. The above analysis of MEPT and the ODCE peer group reveals that ODCE fund managers can improve their relative efficiency by employing moderate leverage (mid to high 20% range) and moderate exposure to Multifamily and Other product types (approximately 30%, with that majority of the allocation to Multifamily). These performance enhancing fund characteristics were revealed by applying a greater analytical discipline to a commercial real estate portfolio, which is now an "essential part of a sophisticated manager's portfolio."

Appendix A

List of MEPT Assets

PropertyName	PropertyType	MetroMarket
Medinah	Industrial	Chicago, IL
Forest Park Land	Industrial	Philadelphia, PA
Harman International Business Campus	Industrial	Los Angeles, CA
Greenspoint Office Building	Office	Chicago, IL
Burlington Office Centre I	Office	Boston, MA
Forest Park I-IV	Industrial	Philadelphia, PA
Northport Business Park I	Industrial	San Francisco, CA
Commerce Park-Tualatin I	Industrial	Portland, OR
North by Northwest Land	Industrial	Indianapolis, IN
Kirts Equity	Office	Detroit, MI
Kirkland Flex	Industrial	Seattle, WA
Forest Park 18	Industrial	Philadelphia, PA
Barrington Pointe	Office	Chicago, IL
Forest Park 17	Industrial	Philadelphia, PA
Forest Park 19	Industrial	Philadelphia, PA
Commerce Park-Tualatin II	Industrial	Portland, OR
Tanasbourne I	Office	Portland, OR
Commerce Park-Tualatin III	Industrial	Portland, OR
Northport Business Park II	Industrial	San Francisco, CA
Alderwood Corporate Center I	Industrial	Portland, OR
212 Corporate Center	Industrial	Portland, OR
West 70 Commerce Center Land	Industrial	St. Louis, MO
Seattle Retail Core / Pacific Place	Retail	Seattle, WA
West 70 Commerce Center I	Industrial	St. Louis, MO
Alderwood Corporate Center II	Industrial	Portland, OR
Southwest Commerce Center I	Industrial	Reno, NV
Forest Park 20	Industrial	Philadelphia, PA
Highlands Corporate Center	Office	Seattle, WA
Commerce Executive VI	Office	Washington, DC
Westbrook Corporate Center	Office	Philadelphia, PA
Alderwood Corporate Center III	Industrial	Portland, OR
Burlington 400	Office	Boston, MA
Burlington Land	Office	Boston, MA
Allendale Corporate Center	Industrial	New York, NY
Oyster Point I	Office	San Francisco, CA
Two Conway Park	Office	Chicago, IL
Centrepointe Chino	Industrial	Riverside, CA
Cabrillo Technology Center	Office	San Diego, CA
Canyon Park 228 Corporate Center	Office	Seattle, WA
Southwest Commerce Center II	Industrial	Reno, NV
1660 International Drive	Office	Washington, DC
Valencia Commerce Center I	Industrial	Los Angeles, CA
Mission Trails Industrial Ctr	Industrial	San Diego, CA
Southwest Commerce Ctr III	Industrial	Reno, NV
Coal Creek Business Park I	Office	Boulder, CO
5901 College Boulevard	Office	Kansas City, MO
Shaw Park Plaza	Office	St. Louis, MO
Mount Eden	Industrial	San Francisco, CA
Haven Gateway	Industrial	Riverside, CA
Meadows Office Building I	Office	Chicago, IL
Alexander Park I	Office	Trenton, NJ
Maryland 95 Corporate Center	Office	Washington, DC

	Office	Chicago, IL
	Office	Chicago, IL
	Office	Los Angeles, CA
Agave Center	Office	Phoenix, AZ
Courthouse Tower	Office	Washington, DC
West 70 Commerce Center III	Industrial	St. Louis, MO
Oyster Point II	Office	San Francisco, CA
Valencia Commerce Center II	Industrial	Los Angeles, CA
Corporate Pointe at West Hills	Office	Los Angeles, CA
Peakview Office Plaza I & II	Office	Denver, CO
West 70 Commerce Center V	Industrial	St. Louis, MO
W Silicon Valley	Hospitality	San Francisco, CA
Pacific Vista Business Center	Office	Los Angeles, CA
The McGuire (Carpenters Tower)	Residential	Seattle, WA
Centrepointe Chino II	Industrial	Riverside, CA
River Run	Residential	Chicago, IL
Hollis Business Center	Office	San Francisco, CA
Alexander Park II	Office	Trenton, NJ
Pictoria Corporate Center	Office	Cincinnati, OH
Burlington 300	Office	Boston, MA
College & Renner Corporate Center	Industrial	Kansas City, MO
Coal Creek Business Park II	Office	Boulder, CO
Meadows Office Building II	Office	Chicago, IL
Lyndwood Executive Center	Office	Baltimore, MD
Skyway Court	Industrial	San Francisco, CA
Tanasbourne II	Office	Portland, OR
Brewery Block 2	Office	Portland, OR
Gates Plaza	Office	Denver, CO
Arena Corporate Center	Office	Los Angeles, CA
Rivergate Corporate Center	Industrial	Portland, OR
1717 Rhode Island	Office	Washington, DC
Cheyenne Corporate Center	Industrial	Las Vegas, NV
Patriots Plaza Phase I	Office	Washington, DC
Rivergate Corporate Center II	Industrial	Portland, OR
3500 Lacey Road	Office	Chicago, IL
Patriots Plaza Phase II & III	Office	Washington, DC
Century Technology Campus	Industrial	Washington, DC
Gateway Distribution Center I	Industrial	St. Louis, MO
Zenith	Residential	Baltimore, MD
Coventry Glen	Residential	Chicago, IL
Russell Ranch Road	Office	Los Angeles, CA
Octagon Park Apartments	Residential	New York, NY
GSW Gateway	Industrial	Dallas, TX
Pinnacle Park	Industrial	Dallas, TX
One Pierce/500 Park	Office	Chicago, IL
Milestone Business Park	Office	Washington, DC
Milestone Land	Office	Washington, DC
Canyon Park Apartments	Residential	Riverside, CA
Lighton Plaza	Office	Kansas City, MO
Hamilton Lakes E. Land Note Receivable	Office	Chicago, IL
Village of Blaine Shopping Center	Retail	Minneapolis, MN
Gateway Commerce Center-Land	Industrial	St. Louis, MO
801 Massachusetts Avenue	Office	Boston, MA
Inverwood Business Park-Land	Industrial	Minneapolis, MN
1900 16th St	Office	Denver, CO
Kansas Commerce Center	Industrial	Kansas City, MO
McClurg Court Center	Residential	Chicago, IL
Gateway Commerce Center II	Industrial	St. Louis, MO

[illegible]	Industrial	St. Louis, MO
[illegible]	Office	Los Angeles, CA
[illegible]	Office	Washington, DC
Jefferson at Plymouth	Residential	Minneapolis, MN
Rivergate Corporate Center III	Industrial	Portland, OR
Journal Square	Residential	New York, NY
35/13 Crossings	Industrial	Minneapolis, MN
2600 Regent Boulevard	Industrial	Dallas, TX
1800 Arch Street	Retail	Philadelphia, PA
Gateway Distribution Center II	Industrial	St. Louis, MO
360 State Street	Residential	New Haven, CT
777 Sixth Street NW	Office	Washington, DC
Sixth & Lenora Apartments	Residential	Seattle, WA
USA Parkway Distribution Center I & II	Industrial	Reno, NV
Reno Industrial Center	Industrial	Reno, NV
20 North Clark Street	Office	Chicago, IL
Burlington 100	Office	Boston, MA
The Ardea	Residential	Portland, OR
Southwest Commerce Ctr IV	Industrial	Reno, NV
Springbrook Prairie Pavilion	Retail	Chicago, IL
360 State Street Loan Receivable	Residential	New Haven, CT
Residences at Congressional Village	Residential	Washington, DC
Boardwalk at Town Center	Residential	Houston, TX
Hillsboro Bay Club	Residential	Miami, FL
Milestone V	Office	Washington, DC
Rivergate Corporate Center IV	Industrial	Portland, OR
Ashton at Dulles Corner	Residential	Washington, DC
Westwood Village	Retail	Seattle, WA
1900 Clark Road	Industrial	Baltimore, MD
Bethany Village	Retail	Atlanta, GA
Dean Taylor Crossing	Retail	Atlanta, GA
Kedron Village	Retail	Atlanta, GA
Tree Summit Village	Retail	Atlanta, GA
West Cobb Marketplace	Retail	Atlanta, GA
ChampionsGate Village	Retail	Orlando, FL
Goolsby Pointe	Retail	Tampa, FL
Sawgrass Center	Retail	Miami, FL
Towne Centre at Wesley Chapel	Retail	Tampa, FL
Four Points Centre	Retail	Austin, TX

Appendix B

NCREIF Regional Definitions

East Region	West Region
Connecticut	Alaska
Delaware	Arizona
Kentucky	California
Maine	Colorado
Maryland	Hawaii
Massachusetts	Idaho
New Hampshire	Montana
New Jersey	Nevada
New York	New Mexico
North Carolina	Oregon
Pennsylvania	Utah
Rhode Island	Washington
Vermont	Wyoming
Virginia	
Washington DC	
West Virginia	

South Region	Midwest Region
Alabama	Illinois
Arkansas	Iowa
Florida	Indiana
Georgia	Kansas
Louisiana	Michigan
Mississippi	Minnesota
Oklahoma	Missouri
Tennessee	Nebraska
Texas	North Dakota
	Ohio
	South Dakota
	Wisconsin

Appendix C

Works Cited

Anderson, D.R., D.J. Sweeney, and T.A. Williams. *Statistics: Concepts and Applications*. McGraw-Hill Education, 1995. Print.

Brigham, Eugene F., and Joel F. Houston. *Fundamentals of financial management*. 8th ed. Fort Worth: Dryden Press, 1998. Print.

Brooks, CFA, Scott . "Direct Real Estate: Institutional Grade Investing for Individuals' Portfolios." *RREEF Investment Perspectives* -.- (2011): -. Print.

DeLisle, James R.. *Real Estate: A Distinct Asset CLass or an INdustry Sector*. Seattle: University of Washington, 1995. Print.

Florance, Andrew C. , Norm G. Miller, Jay Spivey, and Ruijue Peng. "Slicing, Dicing, and Scoping the size of the U.S. Commercial Real Estate Market." *Journal of Real Estate Portfolio Management* 16.2 (2010): 111. Print.

Horcher, Karen A.. *Essentials of financial risk management*. Hoboken, N.J.: Wiley, 2005. Print.

"MEPT." *MEPT*. N.p., n.d. Web. 1 Oct. 2011. <http://mept.com>.

"MIT Center for Real Estate." *MIT - Massachusetts Institute of Technology*. N.p., n.d. Web. 15 Nov. 2011. <http://web.mit.edu/cre/>.

Markowitz, H.. *Portfolio selection; efficient diversification of investments.*. New York: Wiley, 1959. Print.

McDonald, Linda, and Brooke Stiver. "Institutional Real Estate - Investment Style Categories." *CRA RogersCasey LLC* - (2004): -. Print.

eal Estate investment Fiduciaries." *NCREIF | National Council of Real Estate investment Fiduciaries*. N.p., n.d. Web. 5 Oct. 2011. <http://www.ncreif.org/>.

NCREIF. "ODCE September 2011 Biannual Peer Trends." - -.- (2011): -. Print.

Staiger, Roger S. "Risk and Return." Financial Strategies . Loyola University Maryland - Sellinger School of Business. -, Columbia, Maryland. 17 Oct. 2011. Lecture.

"S&P 500." *Standard and Poors*. Standard and Poors, n.d. Web. 15 Nov. 2011. <http://www.standardandpoors.com/indices/sp-500/en/us/?indexId=spusa-500-usduf--p-us-l-->.

"U.S. Securities and Exchange Commission (Home Page)." *U.S. Securities and Exchange Commission (Home Page)*. N.p., n.d. Web. 20 Nov. 2011. <http://sec.gov>.

Woodworth, Mark R. . "Falling Profits - Rising Cap Rates." *Cornell Hospitality Quarterly* 50.2 (2009): -. Print.

"iShares Barclays Aggregate Bond Fund (AGG): Overview - iShares." *iShares Exchange Traded Funds (ETFs) - iShares*. N.p., n.d. Web. 15 Nov. 2011. <http://us.ishares.com/product_info/fund/overview/AGG.htm>.